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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED  
DATE 11/11/01 BY 2001/01/11

EXAMINER
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ART UNIT	PAPER NUMBER
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DATE MAILED:

02-11-01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

### Office Action Summary

**Application No.**

09/500,288

**Applicant(s)**

NAGAHAMA ET AL.

**Examiner**

Wai-Sing Louie

**Art Unit**

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 7 and 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8, 16
- 18) ☒ Interview Summary (PTO-413) Paper No(s) 7-8 & 16
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-6, drawn to a semiconductor device, classified in class 257, subclass 94.
  - II. Claims 7-8, drawn to a method of making a semiconductor device, classified in class 438, subclass 22.
2. Applicant elects Group I, which draws to a semiconductor device.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-~~6~~<sup>5</sup> are rejected under 35 U.S.C. 102(e) as being anticipated by Hong et al. (US 6,177,292).

With regard to claim 1, Hong et al. disclose a nitride semiconductor device (col. 4, line 3 to col. 11, line 64 and fig. 7) comprising:

- A GaN substrate 70 having a single crystal GaN layer (col. 5, lines 24-25);
- A plurality of device forming layers made of nitride semiconductor formed on the GaN substrate (col. 10, lines 25-30), where a compressive strain is applied to the

device forming layer which is contacting the GaN substrate (it is inherent to have the compressive strain between layers).

With regard to claim 2, Hong et al. disclose the device-forming layer 71 contacting the GaN substrate has a coefficient of thermal expansion smaller than that of GaN (AlGaIn has a thermal expansion coefficient smaller than GaN).

With regard to claim 3, Hong et al. disclose the device-forming layer 71 contacting GaN substrate is made of AlGaIn (fig. 7).

With regard to claim 4, Hong et al. disclose the device forming layers include an n-type cladding layer 71 containing Al, an active layer 72 containing InGaIn and a p-type cladding layer 73 containing Al (fig. 7).

With regard to claim 5, Hong et al. disclose the device-forming layer made of AlGaIn functions as an n-type contact layer (fig. 7).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al. (US 6,177,292) in view of Davis et al. (US 6,051,849).

With regard to claim 6, Hong et al. disclose growing a single crystal GaN layer, but do not disclose the lateral growth process. Davis et al. disclose fabricating a GaN semiconductor

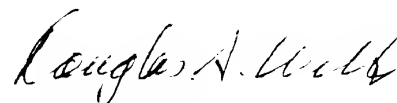
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layer by the lateral growth process (Davis col. 5, lines 1-40). Davis et al. teach a major problem in fabricating a GaN semiconductor layer is having defects, which may propagate vertically (Davis col. 1, lines 26-36 and col. 2, lines 10-16). Lateral growth process can grow GaN layer with relatively defect-free. Hence, it would have been obvious to one with ordinary skill in the art to adapt Davis' lateral growth process in Hong's device into order to grow the GaN substrate without defect such as cracks and warpages.


5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Douglas A. Wille  
Patent Examiner

wsl   
June 27, 2001